NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

ID	STATE PROJECT	ΝΟ.	SHEET	NO.	TOTAL	SHEET
U-2717	34850.1.1	2		13		



SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS										
SOIL DESCRIPTION	GRADATION	ROCK	DESCRIPTION	TERMS AND DEFINITIONS						
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR MEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER 30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL CLASSIFICATION IS	<u>UNIFORM</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAI <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE	GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE RM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE (ALSO POORLY GRADED). RADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.		AT WHEN TESTED, WOULD YIELD SPT REFUSAL AN INFERRED -COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. IN SAMPLER EOUAL TO OR LESS THAN 2.5 cm PER 50 BLOWS, IN BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA.					
BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL	ANGULARITY OF GRAINS		OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS:		ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE					
COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STEF, ORAY SUTY CLUI, MOST WITH INTERBEDGED FINE SAND LAYERS, MINUY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR ROUNDED.		WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER 30 cm. CREATER TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT		PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.					
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION				ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.					
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (.95% PASSING *200) (.95% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.		CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.					
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY		NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN		COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL					
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7		LESS THAN 30	INCLUDES PHY	YLLITE, SLATE, SANDSTONE, ETC. IIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.					
SYMBOL BOOK BOOK BOOK BOOK BOOK BOOK BOOK B	HIGHLY COMPRESSIBLE LIQUID LIMIT	GREATER THAN 50		. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.					
Z PASSING SILT-	PERCENTAGE OF MATERIA	L		WEATHERING	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.					
40 30 MX50 MX51 MN SOILS COILS PEAT	URGANIC MATERIAL SOILS SOILS	OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW	JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP DIRECTION OIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.					
200 15 MX 25 MX 10 MX 135 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 40 MX 41	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LIT	ACE 1 - 10% TTLE 10 - 20%	HAMMER IF CRYSTALLINE.	NAMES COME TO DESCRIPTION OF STATE OF S	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.					
LICOURD LIMIT 48 MX41 MN 48 MX41 MN 48 MX41 MN 501LS WITH PLASTIC INDEX 6 MX N.P. 18 MX10 MX 11 MN 12 MX 11 MN 11 MN LITTLE OR HIGHL'	LICH V ORGANIC NOV NOV NOV	ME 20 - 35% GHLY 35% AND ABOVE	(V. SLI.) CRYSTALS ON A BROKEN SPECIMEN F	NINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.					
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX MODERATE ORGAN			OF A CRYSTALLINE NATURE. - SLIGHT ROCK GENERALLY FRESH, JOINTS STA	AINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL					
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER	DRILLING.	(SLI.) 2.5 cm. OPEN JOINTS MAY CONTAIN	CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR ED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS,	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.					
MATERIALS SAND SAND GRAVEL AND SAND SUILS SUILS	STATIC WATER LEVEL AFTER 24 HOURS.		1	DV DISCOLORATION AND WEATHERING EFFECTS, IN	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.					
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITA	LE PERCHED WATER, SATURATED ZONE OR WATER BEAF	RING STRATA		ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS					
SUBGRADE	SPRING OR SEEPAGE		WITH FRESH ROCK.		LATERAL EXTENT.					
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	\$	SEVERE AND DISCOLORED AND A MAJORITY SI	NED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL HOW KADLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	LENS - A BODY OF SOIL OR ROCK THAT THINS DUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY					
PRIMARY SOIL TYPE COMPACTNESS OR PANCE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT DESCRIPTION SPT CPT SPT CP	NG SAMPLE	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEO IF TESTED, WOULD YIELD SPT REFUSA	DLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.					
CONSISTENCY (N-VALUE) (kN/m ²)	— III with sole beschill how	DESIGNATIONS		DRED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.					
GENERALLY VERY LOOSE <4 GRANULAR LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING	S- BULK SAMPLE	EXTENT. SOME FRAGMENTS OF STRON	GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME ING ROCK USUALLY REMAIN.	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.					
MATERIAL MEDIUM DENSE 10 TO 30	ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS CORE BORING			100 BLOWS PER 30 cm.	ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN					
VERY DENSE >50	INFERRED SOIL BOUNDARIES	ST- SHELBY TUBE	(V. SEV.) THE MASS IS EFFECTIVELY REDUCED	D OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING	AND EXPRESSED AS A PERCENTAGE.					
VERY SDFT <2 <25 GENERALLY SOFT 2 TO 4 25 TO 50	MONITORING WE	ILL SAMPLE RS- ROCK SAMPLE	SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. JF. TESTED, YIELDS SPT. N VALUES < 100 BLOWS FER 30 cm. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. OUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.							
SILT-CLAY MEDIUM STIFF 4 TO 8 50 TO 100 MATERIAL STIFF 8 TO 15 100 TO 200 (CONESIVE) VERY STIFF 15 TO 30 200 TO 400	PIEZOMETER INSTALLATION SLOPE INDICAT	A INSTALLATION RT- RECOMPACTED			SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.					
HARD >30 >400	25/025 DIP/DIP DIRECTION OF INSTALLATION CBR - CBR SAMPLE ROCK STRUCTURES		ROCK HARDNESS		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.					
TEXTURE OR GRAIN SIZE	SOUNDING ROD SPT N-VALUE		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES		STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION					
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053	(REF)— SFT REFUSHL	CREP OF I REPUSHL		LOGISTS PICK. PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED						
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	ABBREVIATIONS		HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		WITH 50 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH					
(BLDR.) (COB.) (GR.) (CSE. SD.) (F. SD.) (SL.) (CL.)	AR - AUGER REFUSAL PMT - PRESSUF BT - BORING TERMINATED SD SAND, SAN	NDY	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 6 mm DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK, HAND SPECIMENS CAN BE DETACHED		OF STRATUM AND EXPRESSED AS A PERCENTAGE.					
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 ⁴ 3 ⁴	CL CLAY SL SILT, SILTY CPT - CONE PENETRATION TEST SLI SLIGHTLY		BY MODERATE BLOWS. MEDIUM CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.		STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED					
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE TCR - TRICONE	E TCR - TRICONE REFUSAL		DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. 'S TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE	BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST - VOID RATIO F FINE FOSS FOSSILIFEROUS FRACL FRACTURED FRAGS FRAGMENTS MED MEDIUM - WILL WEIGHT W - MOISTURE CONTENT V VERY VST - VANE SHEAR TEST		POINT OF A GEOLOGISTS PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 25 mm OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.							
(ATTERBERG LIMITS) DESCRIPTION					BENCH MARK: BL-20, BL Sta. 34+81.356/-L- Sta. 40+18.978, Offset-13.125 m RT; -Y22- Sta. 15+22.01, Offset-28.670 m LT					
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABL					ELEVATION: 256.221 meters					
PLASTIC LIQUID LIMIT					NOTES:					
RANGE - WET - (W) SEMISULIDE REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT F	PROJECT	FRACTURE SPACING	BEDDING						
PLL + PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS:	HAMMER TYPE:	TERM SPACING	IERM IHICKNESS VERY THICKLY BEDDED > 1 m						
OM OPTIMUM MOISTURE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTUR	CLAY BITS	X AUTOMATIC MANUAL	VERY WIDE MORE THAN 3 m WIDE 1 TO 3 m	THICKLY BEDDED 0.5 - 1 m THINLY BEDDED 0.05 - 0.5 m						
SL SHRINKAGE LIMIT		CORE SIZE:	MODERATELY CLOSE 30 TO 100 cm CLOSE 5 TO 30 cm	VERY THINLY BEDDED 10 - 50 mm THICKLY LAMINATED 2.5 - 10 mm						
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 X 203 mm HOLLOW AUGERS		VERY CLOSE LESS THAN 5 cm	THINLY LAMINATED 2.5 - 10 mm THINLY LAMINATED < 2.5 mm	•					
PLASTICITY	CME-45C HARD FACED FINGER BITS		INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.		-					
PLASTICITY INDEX (PI) DRY STRENGTH	X TUNG-CARBIDE INSERTS	П-н								
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT	X CME-550 CASING W/ ADVANCER	HAND TOOLS:		ING WITH FINGER FREES NUMEROUS GRAINS: ILE BLOW BY HAMMER DISINTEGRATES SAMPLE.						
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE			NS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;						
COLOR	OTHER TRICONE	TOTAL TOTAL THE CORD HAND AUGER		KS EASILY WHEN HIT WITH HAMMER,						
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)	CORE BIT	SOUNDING ROD		NS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; ICULT TO BREAK WITH HAMMER.						
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	OTHER OTHER	VANE SHEAR TEST OTHER		RP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;						
		I U OTHER	SAME	PLE BREAKS ACROSS GRAINS.						